Canadian Agency for Drugs and Technologies in Health

RAPID RESPONSE REPORT:
SUMMARY WITH CRITICAL APPRAISAL

TITLE: Dressings and Care of Skin Graft Sites: A Review of Clinical Evidence and Guidelines

DATE: 19 December 2013

CONTEXT AND POLICY ISSUES

A skin graft is sheet of skin harvested from a donor site; it may include the epidermis and part of the dermis (split thickness skin graft) or both the epidermis and dermis (full thickness graft) to cover skin lost due to surgery or trauma.[1] Dressings are used to cover the donor site or the grafted skin; this is done to enhance healing, improve patients' comfort and reduce the pain. Skin dressings can be broadly classified into medicated and non-medicated dressings.[2] Medicated dressings include hydrocolloid dressings, hydrogel dressings. alginate dressings, fibrous absorbent dressings, dressings that contribute to odour management, antimicrobial dressings, and Manuka Honey dressings.[2] The non-medicated dressings include vapour permeable dressings, foam dressings, low adherent dressings, non-adherent wound contact layers, atraumatic absorbent dressings, post-operative dressings, and hydrocapillary dressings.[2] Dressing change may be a traumatic experience for patients and can tax healthcare resources. Pain and discomfort of patients while the dressing is in place and during dressing change may be related to the characteristics of the wound dressing used. Furthermore, dressing type may affect the incidence of wound infection which would affect the frequency of dressing change and the overall success of the skin graft procedure.

The purpose of this review is to evaluate the evidence regarding the optimal dressing type, protocol of dressing change, and clinical practice guidelines for the use of dressings at skin graft sites.

RESEARCH QUESTIONS

1. What is the clinical evidence regarding the optimal type of dressing for use on donor and recipient skin graft sites?

2. What is the clinical evidence regarding the optimal protocol for changing dressings on donor and recipient skin graft sites?

3. What are the evidence-based guidelines regarding the optimal protocols for the type of and changing of dressings on donor and recipient skin graft sites?

KEY FINDINGS

A total of nineteen randomized controlled trials were retrieved; the literature search did not identify any clinical practice guideline or evidence on the optimal protocol for changing dressings. The included reports evaluated twenty-five specific dressing trade names that could be grouped in fourteen different dressing classes. Gauze-based dressings were reported to be the least favorable among the different dressing classes.

METHODS

Literature Search Strategy

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2013, Issue 10), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. Methodological filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, and guidelines. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2008 and November 21, 2013.

Selection Criteria and Methods

One reviewer screened citations and selected studies. In the first level of screening, titles and abstracts were reviewed for relevance. Full texts of any relevant titles/abstracts were retrieved, and assessed for inclusion. The final article selection was based on the inclusion criteria presented in Table 1.

Table 1. : Selection Criteria

Population	Hospitalized adult patients who have undergone skin grafting procedures using autologous or recipient skin grafts
Intervention	Post-graft dressings to facilitate stabilization of skin graft site (donor site and recipient site)
Comparator	None/any
Outcomes	• Type of dressing and any evidence on recommended stabilization of dressings at the surgical site that results in optimal healing, infection prevention • Length of time a dressing should stay on, how often a dressing should be changed in order to ensure optimal healing and infection prevention • Optimal wound protocols (type of dressing, length of time, who should be caring for the wound, whether the dressing should be stitched to the patient or if other methods should be used to ensure that the dressing remains on the patient)
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized-controlled trials, and evidence-based clinical guidelines

Exclusion Criteria

Studies that focused on skin grafts and not the dressing used on these grafts were excluded. The review also excluded studies that evaluated dressings for conditions other than skin grafts such as dressings for ulcers or burns with no skin graft. Non-randomized-controlled studies and case reports were excluded.

Critical Appraisal of Individual Studies

The SIGN50 checklist for the controlled studies was used to evaluate the methodological quality of the included randomized controlled trials.[3] For the included studies a numeric score was not calculated. Instead, the strengths and limitations of the study were described.

SUMMARY OF EVIDENCE

Quantity of Research Available

A total of 457 potential citations were identified by searching the bibliographic database, with 428 citations being excluded during the title and abstract screening based on their irrelevance to the questions of interest. The full text documents of the remaining 29 articles were retrieved. Two additional articles were identified by grey literature and hand search. Of the 31 articles, 12 did not meet the inclusion criteria and were excluded; leaving 19 articles that reported on 19 unique randomized-controlled trials. The literature search did not identify publications or evidence-based guidelines relevant to the optimal protocol for changing dressings on donor and recipient skin graft sites.

A PRISMA diagram demonstrating the study selection process is presented in Appendix I.

Summary of Study Characteristics

Details on studies characteristics are tabulated in Appendix II.

Of the nineteen studies included in the review, nine were open-label,[4-12] three were single-blinded,[13-15] and one was double-blinded,[16] while six studies did not provide information on blinding.[17-22] Four studies were multi-center,[5,9,12,20] and the other studies were conducted in single centers. The sample size was below 100 patients in all included studies except one which included 289 patients.[5]

Three studies evaluated dressings on skin grafts (graft receiver site);[10,11,22] skin graft was indicated for burn patients in two studies,[10,11] and the third study did not specify the reason of skin graft.[22] All other studies evaluated dressings on the graft donor sites. Two trials reported that the dressing was installed by surgeons,[4,5] while the other studies did not specify who installed the dressings. The evaluated dressings included the following materials:

- polymer-based dressing (transforming methacrylate (TMD) or Suprathel)[4,14]
- crystalline cellulose (carboxymethylcellulose (CMC-Ag), Veloderm, Rayon)[4,9,20]
- alginate (Kaltostat, Algisite, Melgisorb)[5-7,17]
- polyurethane (Opsite, Biatain-Ibu)[5,7,12,14-16]
- gauze dressing (Adaptic, Jelonet, Xeroform, Vaseline)[5,8,9,15,21,22]

- hydrocolloid (DuoDerm E, Tegaderm)[5,18]
- hydrofiber (Aquacel)[5,6,12,16,19,21]
- silicone dressing (Mepitel, AWBAT-D)[5,10,14,18]
- keratin dressing (Keramatrix – Replicine)[17]
- self-adhesive fabric dressing (Mefix) with or without fibrin sealant.[13]
- multilayer combination (Oxyband)[8,22]
- nylon dressing (Bridal veil)[10]
- carbohydrate wound dressing (Glucan II)[19]
- negative pressure dressing[11]

The clinical efficacy of the different dressings was evaluated in terms of pain, rate of re-epithelialization, number of dressing changes, and patients and healthcare giver preferences.

Summary of Critical Appraisal

Details on individual study appraisal are tabulated in Appendix III.

Blinding of the trial interventions is important to reduce bias in the evaluation of subjective outcomes such as pain and degree of re-epithelialization; however, only one trial adopted a double blind design,[16] and three studies employed the single-blinded design in which patients were blinded to the allocated dressing.[13-15] The four trials employed secondary dressings to cover up the dressing in contact with graft sites; however, the efficacy of this blind might be questionable since the touch and feel of the different dressings might indicate the allocated dressing. On the other hand, the majority of the included trials were either open-label[4-12] or did not provide information on blinding.[17-22]

The sample size was based on statistical calculation in five trials,[5,7,12,13,19] while all other trials included convenient sample sizes which were relatively small and did not permit for solid conclusions due to limited statistical power.

Studies that evaluated rate of re-epithelialization were limited by the fact that the assessment of this outcome was subjective, and the exact time-point of re-epithelialization could not be exactly specified. The external validity of the included studies might be limited be several factors; first, evaluating wound dressing in clinical trial setting might not reflect the clinical practice because of the close follow-up and the frequent dressing changes that might affect the infection rates. Furthermore, the generalizability of findings from small single-center studies was another potential limitation of the included studies. And finally, one out of nineteen included trials was conducted in collaboration with a Canadian center; therefore, the findings of the non-Canadian studies might not be applicable to the Canadian setting because of local differences in clinical practice and the availability of products.

Summary of Findings

Details on individual study findings are tabulated in Appendix IV.

Polymer-based dressing

Transforming methacrylate (TMD) was compared to carboxymethylcellulose (CMC-Ag) in one study of 34 patients.[4] The study showed that TMD, compared to CMC-Ag, was associated with

lower pain scores and better patient satisfaction, but the two dressings did not differ in terms of number of dressing changes and the time to complete healing.[4]

Suprathel (a polymer-based dressing) was evaluated in a study of 72 patients, and it was compared to a polyurethane dressings (Biatain-Ibu) and a silicone dressing (Mepitel).[14] The three dressings had similar time to re-epithelialization, but Suprathel had a significantly lower number of dressing changes compared to the two other dressings.[14]

Crystalline cellulose dressings

Results for the comparison between CMC-Ag and TMD are presented above.[4]

Veloderm was compared to Vaseline gauze in 96 patients.[9] The study showed that Veloderm was associated with lower time to complete healing and number of dressing changes. The two dressings did not differ in terms of incidence of exudate, peri-lesional erythema or pain intensity.[9]

Rayon dressing was compared to Veloderm in a study of 14 patients and 28 skin graft donor sites.[20] Rayon dressing showed lower dressing adherence to wound and lower 1st day pain score; the two dressings did not differ in terms of pain beyond day 14, hyperemia, edema and pruritus.[20]

Alginate dressings

Brolmann et al. included 289 patients in their trial and analyzed the results of 288 patients. The trial compared six types of dressings including alginate (Kaltostat, Algisite or Melgisorb), semi-permeable film (Tegaderm or Opsite), gauze dressing (Adaptic or Jelonet), hydrocolloid (DuoDerm E), hydrofiber (Aquacel), silicone dressing (Mepitel).[5] The study evaluated the dressing materials in terms of time to healing, pain scores, clinical infections and hypergranulation. Results showed that the six types of dressings did not differ with statistical significance except in the following cases: first, the semi-permeable films (Tegaderm or Opsite) were associated with lower pain scores than any other dressing type; second, the hydrocolloid dressing (DuoDerm E) required lower time (seven days difference) to healing than all other dressings; finally, the gauze dressings (Adaptic or Jelonet) were associated with the highest incidence of clinical infections.[5]

Alginate-based dressings were also evaluated in three other trials; the first one compared Algisite to a keratin dressing (Keramatrix).[17] The trial showed that Algisite was associated with higher rate of epithelialization seven days after the operation than Keramatrix in patients older than 50 years; for younger patients, the rate of epithelialization did not significantly differ.[17] Ding et al. compared time to healing and pain scores between alginate-silver dressing and hydrofiber dressing (Aquacel-A) in 10 patients and 20 donor sites; the results showed that the alginate dressing was associated with shorter time to healing and lower pain scores.[6] The third trial compared Algisite covered by a polyurethane dressing (Opsite) to paraffin gauze dressing; the results showed that the two dressings did not differ in terms of pain scores, time to epithelialization and the assessment of general comfort. Algisite dressings required more dressing changes (34 times) than the paraffin gauze (4 times).[7]

Polyurethane dressings

Opsite and Tegaderm films were evaluated in Brolemann's study, and the results were presented above.[5] Another trial compared the Opsite dressing to a hydrofiber dressing (Aquacel-A); the results showed that Opsite was associated with lower scores of pain.[16]

The Biatain-Ibu dressing was compared to Suprathel (polymer dressing) and Mepitel (silicone dressing); the results were presented above with polymer-based dressings.[14] Another study compared Biatain-Ibu to a gauze dressing (Jelonet), and it was reported that Biatain-Ibu was associated with lower pain and itching than Jelonet; however, the study did not report any statistical testing for the differences between interventions.[15]

Gauze dressings

Gauze dressings were evaluated in seven trials; the results of four trials were reported earlier in this section,[5,7,9,15] and the remaining three trials were as follows: one trial compared Xeroform (gauze dressing) to a multilayer dressing (Oxyband) and showed that Xeroform was associated with longer healing time and higher pain scores than Oxyband.[8] The second trial compared paraffin gauze to a hydrofiber dressing (Aquacel) and reported that the paraffin gauze was associated with longer re-epithelialization time and higher pain score during dressing.[21] The last trial compared Jelonet to a multilayer dressing (Allyven) as a dressing over a skin graft (receiver site); the results showed that the two dressings did not affect the time to graft take, number of nursing interventions, or post-operative infections; however, they showed that Jelonet was associated with higher pain score at the time of dressing removal.[22]

Hydrocolloid dressings

The efficacy of DuoDerm E was compared to six other dressing materials in Brolmann's trial; the results of this trial were presented earlier in this section.[5] In another trial, DuoDerm was compared to a silicone-based dressing (AWBAT-D); the trial showed that the two dressings did not differ in terms of pain scores, wound size or time to discharge, but the DuoDerm was associated with shorter time to re-epithelialization.[18]

Hydrofiber dressings

The efficacy of Aquacel was studied in six trials; the results of four trials were presented earlier in the section.[5,6,16,21] One of the remaining trials compared Aquacel to carbohydrate wound dressing (Glucan II), and it showed that the two interventions did not differ in terms of time to re-epithelialization, pain scores, or donor site infection.[19] The second trial compared two different protocols of using Aquacel; in the first protocol, Aquacel dressing was covered with gauze, while in the second one, it was covered with polyurethane film (OpSite).[12] The trial reported that the second protocol was associated with a larger number of donor sites healing at day 14 after surgery (88% versus 67%), and it was associated with lower pain during mobility the first day after operation; the two dressings did not differ in pain scores during rest at all time-point evaluations.[12]

Silicone dressings

Four trials evaluated the efficacy of silicone-based dressings; the result three of trials were presented earlier in this section.[5,14,18] The fourth trial compared Mepitel dressing to a nylon

dressing (Bridal veil) when used over a skin graft (receiver site).[10] The results of this trial showed that Mepitel dressing was associated with less pain, easier use, and better overall experience for patients.[10]

Keratin dressings

The efficacy of Keranatrix was evaluated in one study the results of which were presented earlier in this section.[17]

Self-adhesive fabric dressing (Mefix) with or without fibrin sealant

One trial evaluated the difference between using Mefix alone or with a fibrin sealant; the trial showed that the use of fibrin sealant was associated with lower daily pain and incapacity scores, but it did not affect the time to dressing removal or the time to discharge for the hospital.[13]

Multilayer (combination) dressings

The efficacy of Oxyband and Allyven was evaluated in two studies the results of which were presented earlier in this section.[8,22]

Nylon dressings
The efficacy of Bridal veil was evaluated in one study the results of which were presented earlier in this section.[10]

Carbohydrate wound dressings

The efficacy of Glucan dressing was evaluated in one study the results of which were presented earlier in this section.[19]

Negative pressure dressings

One trial compared negative pressure dressings with a conventional dressing with gauze; both dressings were used over skin grafts (receiver sites).[11] The trial reported that the negative pressure dressing was associated with a higher percentage of graft take and shorter duration of dressing.[11]

Limitations

The included studies focused mainly on dressings used over split-thickness skin graft donor sites; these graft sites are usually well perfused and may show spontaneous healing without the use of special dressings. In contrast, there was gap in the clinical research that focused on dressing used on skin grafts or the graft-receiver sites; the review identified three small trials, and their results may not be generalizable to all types of dressing.

Wound management and dressing availability may differ from one jurisdiction to another; the evidence reflecting the Canadian clinical practice was limited to one investigation center in one included trial. The findings of trials in non-Canadian setting may not be generalizable to the Canadian health care system.

CONCLUSIONS AND IMPLICATIONS FOR DECISION OR POLICY MAKING

This report aimed to evaluate the clinical evidence regarding the optimal type of dressing used over skin graft donor and receiver sites. The dressing change protocols and evidence-based clinical guidelines were also search for. A total of nineteen randomized controlled trials were retrieved; the literature search did not identify any clinical practice guidelines.

With respect to the optimal dressing type, the included reports evaluated twenty-five specific dressing trade names that could be grouped in fourteen different dressing classes. The numerous dressing types did not allow for the detection of clear trends on the performance of each dressing type or class. Nevertheless, gauze-based dressings were reported to be the least favorable among the different dressing classes. The findings of these trials should be interpreted in lights of the fact that they were small trials, and they showed high risk of potential bias in the evaluation of outcomes.

PREPARED BY:
Canadian Agency for Drugs and Technologies in Health
Tel: 1-866-898-8439
www.cadth.ca

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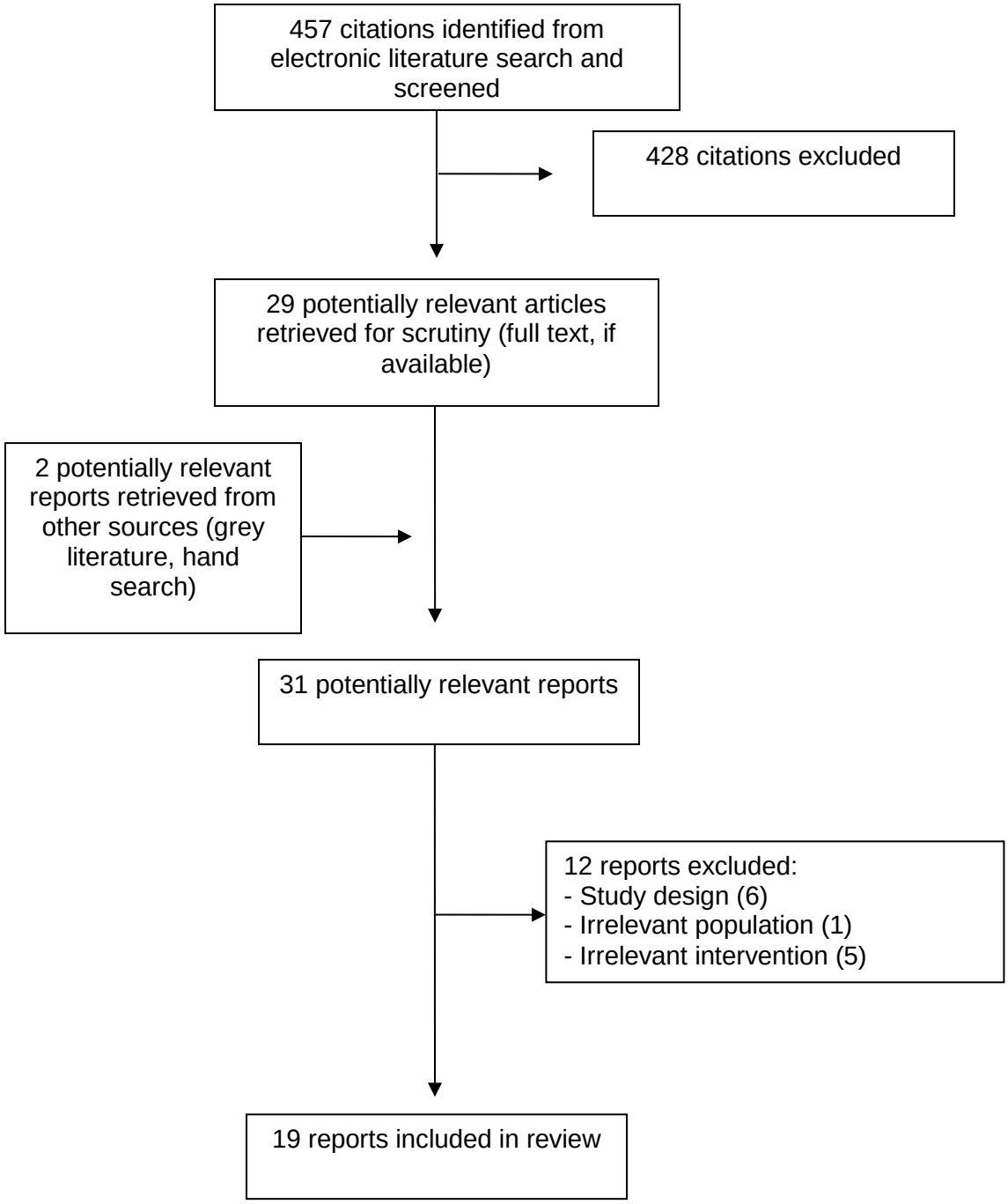
APPENDIX I: SELECTION OF INCLUDED STUDIES



APPENDIX II: CHARACTERISTICS OF THE INCLUDED STUDIES

Characteristics of the Included Controlled Trials

Study Objectives and Design	Inclusion Criteria, Sample Size, and Patient Characteristics	Intervention, Comparator, and Study Conduct	Clinical Outcomes
Assadian et al. 2013[4] - USA			
To investigate the clinical outcomes of TMD dressing as compared with CMC-Ag dressing in the treatment of STSG wound. Single centre, open-label RCT	• Burn patients who required STSGs and had two independent skin donor sites of approximately the same dimensions. • Patients with acutely infected wounds or wounds with surrounding cellulites. • A total of 20 patients were included; results were reported for 17 patients (34 donor sites)	Dressings were applied by one surgeon. • TMD dressing (19 donor sites) • CMC-Ag dressing (19 donor sites) A secondary protective gauze dressing was applied over both dressings. Both comparator dressings were designed to cover and protect the STSG donor area until healing without dressing change unless there was evidence of leakage, bleeding, infection or pain.	• Pain score (measured on a 0–10 Linear Analog Scale) • Time to healing (estimated at the last study visit) • Dressing changes during the study • Patient's and surgeon satisfaction • Adverse events
Brolmann et al. 2013[5] – Netherlands			
To compare the clinical outcomes of six different dressing materials used on donor sites after STSG. Multi-centre, stratified open-label RCT	• Patients who had STSG with donor site wound > 10 cm^2 were included in the trial. • A total of 289 patients were included; 279 patients completed the follow-up period.	Dressings were applied by surgeons. • Alginate (Kaltostat, Algisite or Melgisorb) • Semi-permeable film (Tegaderm or Opsite) • Gauze dressing (Adaptic or Jelonet) • Hydrocolloid (DuoDerm E) • Hydrofiber (Aquacel) • Silicon dressing (Mepitel) Only cotton gauze and bandages were allowed as secondary dressing. Frequency for dressing change was as follows: • Never (alginate and hydrofibre), • Weekly (film and hydrocolloid) or • Every 10–14 days (gauze and silicone).	• Time to complete wound healing (full re-epithelialization • Pain (measured on visual analogue scale)

CMC-AG= silver-containing carboxymethylcellulose; RCT = randomized-controlled trial; STSG = split-thickness skin graft; TBSA = total body skin area; TMD = transforming methacrylate

Characteristics of the Included Controlled Trials

Study Objectives and Design	Inclusion Criteria, Sample Size, and Patient Characteristics	Intervention, Comparator, and Study Conduct	Clinical Outcomes
Davidson et al. 2013[17] – New Zealand			
To determine if the keratin-based dressing accelerates epithelialization rates during healing of STSG wounds. Single centre RCT	• Patients undergoing a split skin graft as part of reconstructive surgery • Each donor site was covered by the two dressing options • A total of 37 patients were included in the trial; 26 patients were included in outcome assessment.	• Alginate dressing (Algisite) for two weeks • Keratin dressing (Keramatrix – Replicine) – duration of dressing was not reported	• Percentage of epithelialization seven days after surgery; this was assessed by a blinded clinician • Pain on removal
Ding et al. 2013[6] – China			
To compare the clinical outcomes between Aquacel Ag and Alginate Silver as donor site dressings after STSG. Single centre, open-label RCT	• The included patients had 5 to 30% total body surface area skin loss due to burns, trauma or surgery. • The lost skin was replaced by split thickness grafts • A total of 20 patients were enrolled in the trial.	Each patient received either • Aquacel Ag (10 patients), or • Alginate Silver (10 patients) Secondary protection was applied to both dressings using Vaseline gauze. The dressing of the donor site remained intact for 3 days postoperatively. In the third day after surgery, the external dressing was opened and changed the Aquacel and alginate. From that day on, the external dressing was opened in the interval of 2 days. The amount of exudates and the signs of infection were checked. If there was too much exudate, the dressings were changed.	• Mean time to healing (re-epithelialization) • Pain scores • Infection rate

CMC-AG= silver-containing carboxymethylcellulose; RCT = randomized-controlled trial; STSG = split-thickness skin graft; TBSA = total body skin area; TMD = transforming methacrylate

Characteristics of the Included Controlled Trials

Study Objectives and Design	Inclusion Criteria, Sample Size, and Patient Characteristics	Intervention, Comparator, and Study Conduct	Clinical Outcomes
Healy et al. 2013[13] – UK			
To evaluate pain and incapacity in split skin graft donor sites treated with and without fibrin sealant. Single center, patient-blinded RCT	• Patients undergoing split skin grafting from a lateral thigh donor site were eligible for inclusion. • A total of 50 patients were enrolled in the trial; results of 40 patients were included in the analyses.	**Intervention group: (20 patients)** • The donor site was sprayed with fibrin sealant immediately after graft harvest and then self-adhesive fabric dressing (Mefix) was applied on top. **Control group: (20 patients)** • The Mefix was applied directly to the wound as a primary dressing **Both groups had the following secondary protection** • Gauze, Velband, and crepe bandages were applied as the secondary, outer dressings so that externally the dressings appeared to be the same for the two groups.	• Pain scores • Incapacity scores • Length of hospital stay • Duration of requirement for dressing
Kaiser et al. 2013[7] – Switzerland			
To compare postoperative healing of STSG donor sites using paraffin gauze or alginate dressing and polyurethane film. Single center, open-label RCT	• A total of 30 patients were included in this trial	**Intervention group:** • Alginate dressing (Algisite M) • Polyurethane film (Opsite Flexigrid) • **Control group:** • Paraffin gauze containing 0.5% chlorhexidine acetate (Bactigras)	• Pain during dressing changes, • Wearing comfort, • Time until re-epithelialization, • Cosmetic results. • The number of dressing changes, • Costs, • Satisfaction of the patient with the entire procedure.

CMC-AG= silver-containing carboxymethylcellulose; RCT = randomized-controlled trial; STSG = split-thickness skin graft; TBSA = total body skin area; TMD = transforming methacrylate

Characteristics of the Included Controlled Trials

Study Objectives and Design	Inclusion Criteria, Sample Size, and Patient Characteristics	Intervention, Comparator, and Study Conduct	Clinical Outcomes
Lairet et al. 2013[8] – USA			
To compared the OxyBand dressing with the Xeroform dressing with respect to donor site healing time. Single-center, open-label RCT	• The included patients were adult burn patients with less than 30% TBSA thermal injuries admitted to the U.S. Army Institute of Surgical Research Burn Center. • A total of 20 patients were included; the outcomes of 17 patients were included in the result analyses	**Intervention group:** • OxyBand (multilayer dressing comes prefilled with high levels of oxygen between the layers). Dressings were changed on postoperative days 4 and 8, and then every 2 days until healed. OxyBand dressings were changed more frequently if the adhesive edges became non-adherent. **Control group:** • Xeroform gauze (3% bismuth tribromophenate). The dressings were not changed	• Time to healing • Wound infection • Pain score
Liu et al. 2013[9] – China			
To evaluate the efficacy and safety of crystalline cellulose wound dressing (Veloderm) in the management of skin donor sites. Multi-center, open-label RCT	• Patients who had a total area of skin loss or burn surface less than 50% of total body skin area, and who had the STSG donor site surface area > 100 cm2 were eligible for inclusion • A total of 96 patients who required autologous split skin graft were included in the trial.	**Intervention group:** • Crystalline cellulose (Veloderm) **Control group:** • Vaseline gauze The need for a dressing change was based on the circumstance of re-exposure of the wound, accumulation of fluids under the dressing, and the presence of moderate erythema and infiltration.	• Time to healing • Need for dressing change • Pain scores
Patton et al. 2013[10] – USA			
To evaluate the clinical outcomes of a soft silicone wound contact layer (Mepitel One) vs Bridal Veil and staples used on split thickness skin grafts. Single center, open-label RCT	• Patients with 1 to 25% TBSA deep partial or full-thickness burns requiring skin grafting were eligible for inclusion. • A total of 43 patients were included	**Intervention group:** • Mepitel One **Control group:** • Bridal Veil and staples	• Pain • Dressing removal (attachment of the product to the graft and separation of the graft from the wound bed) • Graft take and healing (>95% graft take) • Peri-wound status

CMC-AG= silver-containing carboxymethylcellulose; RCT = randomized-controlled trial; STSG = split-thickness skin graft; TBSA = total body skin area; TMD = transforming methacrylate

Characteristics of the Included Controlled Trials

Study Objectives and Design	Inclusion Criteria, Sample Size, and Patient Characteristics	Intervention, Comparator, and Study Conduct	Clinical Outcomes
Solanki et al. 2012[18] – Australia			
To evaluate patient comfort and the clinical outcomes of a biosynthetic material (AWBAT-DTM) in the healing of split-skin graft donor sites. RCT	• Patients with deep burns less than 30% TBSA requiring split thickness skin grafting were eligible for inclusion. • A total of 14 patients were included; 2 patients had both dressing types for two donor sites	**Intervention group:** • AWBAT-D (thin medical grade silicone membrane attached to a finely knit nylon fabric to which porcine collagen peptides are bound) • The dressing was affixed in place with Hypafix tape at the edges **Control group** • Duoderm	• Pain • Wound size • Time to re-epithelialization • Time to discharge • Infections
Bailey et al. 2011[19] – USA			
To compare the clinical outcomes between Aquacel Ag and Glucan II as donor site dressings. Single center RCT	• Patients with 1 to 30% TBSA full-thickness skin loss were eligible for inclusion • A total of 20 patients were included	• Each patient received both types of dressing: medial and lateral thigh donor sites were randomized to receive one of the intervention **Intervention group:** • Aquacel-Ag **Control group:** • Glucan II "*Standard procedures for each donor site were employed by burn nursing staff and the outpatient clinicians. The donor sites were covered with nonadherent, absorptive pads and secured with gauze rolls and ace wraps.* *On postoperative day 3, all donor sites were left open to air. On postoperative day 7, both sites were covered with copious amounts of Vaseline and covered with Vaseline gauze. The donor dressings were removed completely, in most cases, on postoperative day 8.*" (page 628)	• Time to re-epithelialization • Pain score • Donor site infection

CMC-AG= silver-containing carboxymethylcellulose; RCT = randomized-controlled trial; STSG = split-thickness skin graft; TBSA = total body skin area; TMD = transforming methacrylate

Characteristics of the Included Controlled Trials

Study Objectives and Design	Inclusion Criteria, Sample Size, and Patient Characteristics	Intervention, Comparator, and Study Conduct	Clinical Outcomes
Dornseifer et al. 2011[16] – Germany			
To compare the polyurethane dressing system and Aquacel as donor-site dressing. Single-center, double-blind RCT	• Patients who required skin grafting as a single procedure or in combination with other reconstructive surgery were eligible. • A total of 50 patients were included	• Each patient received both types of dressing by equally dividing donor site. • **Intervention group:** • OpSite (polyurethane dressing) • **Control group:** • Aquacel A (hydrofiber dressing) Two layers of cotton gauze pads were placed onto both dressings and beyond its borders, allowing for double-blind evaluation. The dressing of the donor site remained intact until day 10 and was removed at an earlier time only if an infection was confirmed.	• Pain
Petkar et al. 2011[11] – India			
To compare the clinical outcomes of negative pressure dressing with conventional graft dressings. Single-center, open-label RCT	• Patients who required skin grafting in a burnt area, whether acute or old burn, were eligible for inclusion. • A total of 40 STSG were grafted on 30 patients.	Split-skin graft was laid and secured with staplers or catgut sutures as necessary. Patients were randomized to: **Intervention group:** • Negative pressure dressing: o Vaseline gauze was placed on the graft. o Low-density polyurethane foam was cut to the shape of the graft and placed over the Vaseline gauze. o A flexible transparent plastic tube of 5mm inner diameter and 1 m length was perforated at sides near one end and the same was inserted into the foam by making a shallow slit in the latter. o The whole assembly was covered by a broader sterile transparent adhesive film (Opsite) whose edges were sealed to the normal skin surrounding the dressing so that the dressing is isolated from the environment except through the lumen of the plastic tube. o The tube was then connected to a continuous wall suction of 80mm Hg when the patient was shifted from the operation theatre. **Control group:** • Conventional dressing using Vaseline gauze, cotton pads and cotton bandage (for limbs) or elastic	• Graft take • Duration of dressing

Characteristics of the Included Controlled Trials

Study Objectives and Design	Inclusion Criteria, Sample Size, and Patient Characteristics	Intervention, Comparator, and Study Conduct	Clinical Outcomes
		adhesive bandage (for trunk).	
Blome-Eberwein et al. 2010[12] – USA and Canada			
To evaluate the clinical outcomes of using a hydrofiber dressing for the treatment of STSG donor site. Multi-center, open-label RCT	• Patients undergoing STSG harvested from the anterior thigh and first-time harvest from the selected thigh. • A total of 73 patients were randomized; 70 of which were treated and evaluated.	The initial hydrofiber (Aquacel-Ag) was applied as the primary dressing in both treatment groups. **Intervention group:** • Dry dressing (Adherent) – the hydrofiber dressing was covered with gauze. **Control group:** • Wet dressing (Gelled) – the hydrofiber was covered with a transparent polyurethane film (OpSite). In both groups, the choice and quantity of outer dressings was at the discretion of the investigator	• Donor site healing • Pain
Markl et al. 2010[14] – Germany			
To compare the clinical outcomes of three wound dressings; Mepitel, Suprathel and Biatain-Ibu for the treatment of STSG. Single-center, single-blinded RCT	• Patients undoing STSG. • A total of 77 patients were included	The trial interventions were: • **Suprathel** (Synthetic copolymer) • **Biatain-Ibu** (hydrophilic polyurethane foam) • **Mepitel** (medical grade silicone bound to a soft and pliable polyamide net)	• Pain • Re-epithelialization • Number of dressing changes • Duration of single dressing change (minutes) • Total time consumption

CMC-AG= silver-containing carboxymethylcellulose; RCT = randomized-controlled trial; STSG = split-thickness skin graft; TBSA = total body skin area; TMD = transforming methacrylate

Characteristics of the Included Controlled Trials

Study Objectives and Design	Inclusion Criteria, Sample Size, and Patient Characteristics	Intervention, Comparator, and Study Conduct	Clinical Outcomes
Cigna et al. 2009[15] – Italy			
To evaluate the clinical outcomes of polyurethane foam dressing for the treatment of STSG donor site. Single-center, single-blinded RCT	• Patients requiring STSG were eligible for inclusion in this trial. • A total of 40 patients were included.	**Intervention group:** • Biatain-Ibu (hydrophilic polyurethane foam) - The donor sites were covered with gauzes intraoperatively as a secondary dressing so that the donor sites were totally covered. **Control group** • Jelonet gauze - The secondary dressing used was the same as for the intervention group.	• Pain (assessed on the visual analogue scale) • Itching score • Wound infection
Ferreira et al. 2009[20] – Brazil			
To compare the The clinical outcomes of STSG donor sites covered with a hemicellulose dressing with the response of those covered with rayon dressings. Multi-center RCT	• Patients who require STSG • A total of 28 patients	**Intervention group:** • Veloderm (Hemicellulose dressing) **Control group:** • Rayon dressing	• Dressing adherence to the wound • Hyperemia, edema and pruritus • Pain
Lohsiriwat et al. 2009[21] – Thailand			
To evaluate the efficacy of a hydrofiber dressing (Aquacel) for the treatment of STSG wound site. Single-center RCT	• A total of 18 patients with 20 donor sites were included in the trial	**Intervention group:** • Aquacel Ag (hydrofiber dressing) **Control group:** • Paraffin gauze dressing Both groups required secondary dressing with absorptive gauze and bandages with elastic bands	• Rate of re-epithelialization • Pain

CMC-AG= silver-containing carboxymethylcellulose; RCT = randomized-controlled trial; STSG = split-thickness skin graft; TBSA = total body skin area; TMD = transforming methacrylate

Characteristics of the Included Controlled Trials

Study Objectives and Design	Inclusion Criteria, Sample Size, and Patient Characteristics	Intervention, Comparator, and Study Conduct	Clinical Outcomes
Atherton et al. 2008[22] – UK			
To assess the effectiveness of Allevyn as a dressing for skin graft. Single-center RCT	• Patients requiring STSG or full-thickness skin grafts were eligible for inclusion • A total of 60 patients were included	**Intervention group:** • Allevyn (dressing with three separate layers: an outer impermeable polyurethane sheet, an inner layer containing fine pores, and between them an absorbent hydro cellular layer **Control group:** • Jellonet with a bolster of proflavin-soaked cotton wool.	• Rate of graft take at day five • Comfort at dressing taking down • Graft complications

CMC-AG= silver-containing carboxymethylcellulose; RCT = randomized-controlled trial; STSG = split-thickness skin graft; TBSA = total body skin area; TMD = transforming methacrylate

APPENDIX III: CRITICAL APPRAISAL OF THE INCLUDED STUDIES

Strengths	Limitations
Assadian et al. 2013[4] – USA ; RCT 1/19	
• The trial included patients who have two donor sites, and each patient received both interventions; this makes the comparisons between the interventions more reliable because it eliminates intra-patients variability.	• Sample size was determined by convenience, and the trial did not use power calculation to estimate the sample size. The included sample was small to withdraw strong conclusions. • Discontinuation rate was almost 37%, leaving only 12 patients for outcome analyses. • The trial interventions were not blinded; this might have affected the evaluation of outcomes, especially subjective outcomes such as pain and patient's satisfaction.
Brolmann et al. 2013[5] – Netherlands ; RCT 2/19	
• Same secondary dressings were applied for all treatment groups. • Sample size was estimated using statistical power calculations, but this calculation did not account for potential drop-offs and withdrawals.	• Assessment of wound healing was done by the patients or their carers. The assessment of outcomes by independent evaluators would have been more reliable. • The trial interventions were not blinded.
Davidson et al. 2013[17] – New Zealand ; RCT 3/19	
• Outcome assessment was done by a clinician blinded to treatment allocation • Each donor site received the two compared types of dressing; this makes the comparisons between the interventions more reliable because it eliminates intra-patients variability.	• Sample size was determined by convenience, and the trial did not use power calculation to estimate the sample size. The included sample was small to withdraw strong conclusions.
Ding et al. 2013[6] – China ; RCT 4/19	
• Outcome assessment was done by a blinded observer to treatment allocation.	• Sample size was determined by convenience, and the trial did not use power calculation to estimate the sample size. The included sample was small to withdraw strong conclusions.
Healy et al. 2013[13] – UK; RCT 5/19	
• Sample size was estimated using statistical power calculations, but this calculation did not account for potential drop-offs and withdrawals. • Patients were blinded to the allocated treatment.	• The authors reported that the analyses did not adjust for the potential confounding factors such as the use of analgesia, smoking status, and the quality of the donor-site scare.
Kaiser et al. 2013[7] – Switzerland ; RCT 6/19	
• Sample size was estimated using statistical power calculations, but this calculation did not account for potential drop-offs and withdrawals. •	The authors raised several limitations of the trial: • The donor site wounds were superficial at a normally well-perfused locations; these wounds heal very well even without a specialized dressing • The exact time-point of epithelialization could not be established precisely because patients were not evaluated daily. • Relatively small sample size.

Strengths	Limitations
Lairet et al. 2013[8] – USA ; RCT 7/19	
•	• Sample size was determined by convenience, and the trial did not use power calculation to estimate the sample size. The included sample was small to withdraw strong conclusions. • The sample size was relative small • The trial interventions were not blinded.
Liu et al. 2013[9] – China ; RCT 8/19	
• The decision for dressing change was taken by two investigators.	• Sample size was determined by convenience, and the trial did not use power calculation to estimate the sample size. The included sample was small to withdraw strong conclusions. • The trial interventions were not blinded.
Patton et al. 2013[10] – USA ; RCT 9/19	
• Randomization was assured by using sealed envelopes at the time of surgery.	• Sample size was determined by convenience, and the trial did not use power calculation to estimate the sample size. The included sample was small to withdraw strong conclusions. • The trial interventions were not blinded.
Solanki et al. 2012[18] – Australia ; RCT 10/19	
• Randomization was assured by using sealed envelopes at the time of surgery	• Sample size was determined by convenience, and the trial did not use power calculation to estimate the sample size. The included sample was small to withdraw strong conclusions. • The report did not provide information on blinding of treatment allocation for patients, clinicians or outcome evaluators.
Bailey et al. 2011[19] – USA ; RCT 11/19	
• Sample size was estimated using statistical power calculations, but this calculation did not account for potential drop-offs and withdrawals. •	• The report did not provide information on blinding of treatment allocation for patients, clinicians or outcome evaluators.
Dornseifer et al. 2011[16] – Germany ; RCT 12/19	
• Intervention allocation was double-blinded. • Each donor site received the two compared types of dressing; this makes the comparisons between the interventions more reliable because it eliminates intra-patients variability.	• Sample size was determined by convenience, and the trial did not use power calculation to estimate the sample size. The included sample was small to withdraw strong conclusions.
Petkar et al. 2011[11] – India ; RCT 13/19	
• The study intervention was clearly defined and described.	• Sample size was determined by convenience, and the trial did not use power calculation to estimate the sample size. The included sample was small to withdraw strong conclusions. • The report did not provide information on blinding of treatment allocation for patients, clinicians or outcome evaluators.

Strengths	Limitations
Blome-Eberwein et al. 2010[12] – USA and Canada ; RCT 14/19	
• Sample size was estimated using statistical power calculations, but this calculation did not account for potential drop-offs and withdrawals.	• The trial interventions were not blinded. • The outer dressing was not standardized; the choice and quantity of outer dressings was at the discretion of the investigator.
Markl et al. 2010[14] – Germany ; RCT 15/19	
• Patients were blinded to the allocated treatment; this would minimize bias in the evaluation subjective outcomes such as pain. • To insure same STSG thickness, all grafts were excised by the same surgeon. However, this may limit the generalizability of the results to other STSG conducted by surgeons with different grafting skills.	• Sample size was determined by convenience, and the trial did not use power calculation to estimate the sample size. The included sample was small to withdraw strong conclusions.
Cigna et al. 2009[15] – Italy ; RCT 16/19	
• Patients were unaware of the allocated dressing.	• Sample size was determined by convenience, and the trial did not use power calculation to estimate the sample size. The included sample was small to withdraw strong conclusions.
Ferreira et al. 2009[20] – Brazil ; RCT 17/19	
• The trial included 2-months follow-up visit and outcome evaluation.	• Sample size was determined by convenience, and the trial did not use power calculation to estimate the sample size. The included sample was small to withdraw strong conclusions. • The report did not provide information on blinding of treatment allocation for patients, clinicians or outcome evaluators.
Lohsiriwat et al. 2009[21] – Thailand ; RCT 18/19	
•	• Sample size was determined by convenience, and the trial did not use power calculation to estimate the sample size. The included sample was small to withdraw strong conclusions. • The report did not provide information on blinding of treatment allocation for patients, clinicians or outcome evaluators.
Atherton et al. 2008[22] – UK ; RCT 19/19	
• Although the trial was not blinded, care was taken so that one clinician would remove the dressing, and another one (not aware of the dressing group) would evaluate the skin graft.	• Sample size was determined by convenience, and the trial did not use power calculation to estimate the sample size. The included sample was small to withdraw strong conclusions.

APPENDIX IV: RESULTS OF THE INCLUDED STUDIES

<table>
<tr><th colspan="5">Main Study Findings</th><th>Conclusions</th></tr>
<tr><td colspan="5">Assadian et al. 2013[4] – USA ; RCT 1/19</td><td rowspan="11">Compared with CMC-Ag, TMD showed reductions in pain and increased patient comfort;.</td></tr>
<tr><td colspan="5"><table>
<tr><th>Outcome/ Subgroup</th><th>TMD N = 17</th><th>CMC-Ag N = 17</th><th>Difference (TMD – CMC-Ag)</th><th>P-value</th></tr>
<tr><td colspan="5">Pain, average score (SE)</td></tr>
<tr><td>• Day 2 to day 5</td><td>1.6 (0.3)</td><td>3.7 (0.3)</td><td>-2.1 (0.4)</td><td><0.0001</td></tr>
<tr><td>• Day 6 to day 10</td><td>0.7 (0.3)</td><td>2.6 (0.3)</td><td>-1.9 (0.4)</td><td><0.0001</td></tr>
<tr><td>• Day 11 to day 15</td><td>0.2 (0.4)</td><td>1.9 (0.4)</td><td>-1.7 (0.4)</td><td>0.0004</td></tr>
<tr><td colspan="5">Time to Healing</td></tr>
<tr><td>• Mean (SE), days</td><td>14.2 (0.8)</td><td>13.2 (0.7)</td><td>1.0 (0.8)</td><td>0.16</td></tr>
<tr><td colspan="5">Dressing changes</td></tr>
<tr><td colspan="5">Results were not reported</td></tr>
<tr><td colspan="5">Patient’s satisfaction, mean score (SE)</td></tr>
<tr><td>• Did the dressing remain in place after application?</td><td>9.5 (0.9)</td><td>8.6 (1.9)</td><td>Not reported</td><td>0.06</td></tr>
<tr><td>• Did you find the edges of the dressing to be comfortable?</td><td>8.6 (2.3)</td><td>5.9 (1.6)</td><td>Not reported</td><td><0.001</td></tr>
<tr><td>• Did you notice significant pain when the dressing came into contact with your clothing or bedding?</td><td>2.1 (2.5)</td><td>5.1 (2.2)</td><td>Not reported</td><td><0.001</td></tr>
<tr><td colspan="5">CMC-AG= silver-containing carboxymethylcellulose; TMD = transforming methacrylate</td></tr>
</table></td></tr>
<tr><td colspan="5">Brolmann et al. 2013[5] – Netherlands ; RCT 2/19</td><td rowspan="11">Hydrocolloid dressings for donor site wounds reduced healing time by 7 days compared with other dressing materials.</td></tr>
<tr><td colspan="5"><table>
<tr><th>Dressing type</th><th>Time to healing, Median (IQ)</th><th>Pain score, Median (IQ)</th><th>Clinical infection, n (%)</th><th>Hyper granulation, n (%)</th></tr>
<tr><td>Alginate, N = 45</td><td>22 (19-29)</td><td>0.4 (0-1.9)</td><td>0</td><td>1 (2)</td></tr>
<tr><td>Film, N = 49</td><td>23 (14-36)</td><td>0.3 (0-1.0)[b]</td><td>8 (16)</td><td>1 (2)</td></tr>
<tr><td>Gauze, N = 50</td><td>22 (18-33)</td><td>0.3 (0-1.5)</td><td>9 (18)[c]</td><td>0</td></tr>
<tr><td>Hydrocolloid, N = 49</td><td>16 (12-21)[a]</td><td>0.2 (0-1.1)</td><td>1 (2)</td><td>1 (2)</td></tr>
<tr><td>Hydrofibre, N = 47</td><td>22 (15-27)</td><td>0.8 (0-1.5)</td><td>7 (15)</td><td>1 (2)</td></tr>
<tr><td>Silicone, N = 48</td><td>26 (18-33)</td><td>0.4(0.1-1.1)</td><td>2 (4)</td><td>2 (4)</td></tr>
</table>
[a] P < 0.001 versus any other dressing
[b] P =0.038 versus any other dressing
[c] P = 0.022 versus any other dressing</td></tr>
<tr><td colspan="5">Davidson et al. 2013[17] – New Zealand ; RCT 3/19</td><td rowspan="4">Keratin dressings increased the rate of epithelialization of partial-thickness wounds in older patients.</td></tr>
<tr><td colspan="5">Results of 26 patients were available for analyses ; each patient had both dressing materials<table>
<tr><th>Outcome/ Subgroup</th><th>Algisite</th><th>Keramatrix</th><th>difference</th><th>P-value</th></tr>
<tr><td colspan="5">Percentage of epithelialization seven days after surgery, median</td></tr>
<tr><td>• Patients > 50 years</td><td>10%</td><td>5%</td><td>Not reported</td><td>0.023</td></tr>
<tr><td>• Patients < 50 years</td><td colspan="2">80%</td><td>Not reported</td><td>NS</td></tr>
</table></td></tr>
</table>

<table>
<tr><th colspan="5">Main Study Findings</th><th>Conclusions</th></tr>
<tr><td colspan="5">Ding et al. 2013[6] – China ; RCT 4/19</td><td rowspan="5">Alginate silver is a preferred dressing for split thickness donor site areas than Aquacel Ag.</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>Outcome/ Subgroup</td><td>Aquacel Ag N = 10</td><td>Aliginate silver N = 10</td><td>difference</td><td>P-value</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>Time to healing in days, Mean (SE)</td><td>7.96 (0.36)</td><td>7.01 (0.43)</td><td>Not reported</td><td>< 0.02</td></tr>
<tr><td>Pain scores</td><td colspan="3">Results were presented graphically and showed higher pain scores with Aquacel</td><td>< 0.02</td></tr>
<tr><td>Infection rate</td><td>20%</td><td>10%</td><td>Not reported</td><td>> 0.05</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td colspan="5">Healy et al. 2013[13] – UK ; RCT 5/19</td><td rowspan="11">The application of fibrin sealant to split skin graft donor sites reduced pain and allowed a more rapid return to normal activity.</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>Outcome/ Subgroup</td><td>Fibrin Sealant and Mefix</td><td>Mefix Only</td><td>Difference</td><td>P-value</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>Mean daily pain score (n =40)</td><td>0.42</td><td>1.60</td><td>Not reported</td><td>< 0.001</td></tr>
<tr><td>Mean daily incapacity (n = 37)</td><td>0.48</td><td>1.71</td><td>Not reported</td><td>< 0.001</td></tr>
<tr><td>Time to dressing removal (n = 31)</td><td>23.7</td><td>35.0</td><td>Not reported</td><td>0.24</td></tr>
<tr><td>Time discharge from hospital (n = 40)</td><td>3.65</td><td>4.95</td><td>Not reported</td><td>0.33</td></tr>
<tr><td colspan="5">Pain-free throughout study period, n (%)</td></tr>
<tr><td>• Yes</td><td>6 (3.0)</td><td>1 (5.0)</td><td>5</td><td rowspan="2">0.04</td></tr>
<tr><td>• No</td><td>14 (70)</td><td>19 (95.0)</td><td>5</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td colspan="5">Kaiser et al. 2013[7] – Switzerland ; RCT 6/19</td><td rowspan="14">The use of paraffin gauze and dry gauze for the treatment of STSG donor sites proved to be well accepted by patients and required fewer dressing changes than a semiocclusive dressing combination with an alginate and a film dressing, and it did not lead to higher pain scores, higher infection rates, or longer time to healing.</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>Outcome/ Subgroup</td><td>Algisite + Opsite Flexigrid</td><td>Paraffin gauze</td><td>Difference</td><td>P-value</td></tr>
<tr><td colspan="5">Pain, average visual analogue score</td></tr>
<tr><td>• During removal of STSG</td><td>1.1</td><td>0.7</td><td rowspan="4">Not reported</td><td>0.34</td></tr>
<tr><td>• Post-operative, day 1</td><td>2.1</td><td>1.2</td><td>0.26</td></tr>
<tr><td>• Post-operative, day 5 to 7</td><td>1</td><td>0.9</td><td>0.47</td></tr>
<tr><td>• Premature removal of dressing</td><td>2.2</td><td>0.3</td><td>0.56</td></tr>
<tr><td>• Final removal of dressing</td><td>1.9</td><td>1</td><td>0.19</td></tr>
<tr><td colspan="5">Time to epithelialization,</td></tr>
<tr><td>• Mean days</td><td>18.1</td><td>15.4</td><td>Not reported</td><td>0.29</td></tr>
<tr><td colspan="5">Assessment of Dressing Changes</td></tr>
<tr><td>• Number of times</td><td>34</td><td>4</td><td>2.57 times</td><td>< 0.000</td></tr>
<tr><td colspan="5">Assessment of General Comfort of the Procedure</td></tr>
<tr><td>• Overall score</td><td>6.8</td><td>8.3</td><td>Not reported</td><td>0.106</td></tr>
<tr><td colspan="5"></td></tr>
</table>

<table>
<tr><th colspan="5">Main Study Findings</th><th>Conclusions</th></tr>
<tr><td colspan="6">Lairet et al. 2013[8] – USA ; RCT 7/19</td></tr>
<tr><td colspan="5"></td><td rowspan="11">The use of an oxygen-diffusion dressing was associated with a decrease in wound healing time and a decrease in postoperative pain.</td></tr>
<tr><td>Outcome/ Subgroup</td><td>OxyBand</td><td>Xeroform</td><td>Difference</td><td>P-value</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>Time to healing, mean days (SD)</td><td>9.7 (1.7)</td><td>12.7 (2.7)</td><td>Not reported</td><td>< 0.01</td></tr>
<tr><td>Wound infection</td><td colspan="4">There were no incidence of wound infection</td></tr>
<tr><td>Pain score, mean</td><td colspan="4"></td></tr>
<tr><td>• At day 4</td><td>0.6</td><td>1.6</td><td rowspan="3">Not reported</td><td>< 0.05</td></tr>
<tr><td>• At day 8</td><td>0.4</td><td>1.4</td><td>< 0.05</td></tr>
<tr><td>• At day 12</td><td>0.2</td><td>0.5</td><td>< 0.05</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td colspan="6">Liu et al. 2013[9] – China ; RCT 8/19</td></tr>
<tr><td colspan="5"></td><td rowspan="12">Authors concluded that crystalline cellulose is a safe and effective dressing in the management of split-thickness donor sites.</td></tr>
<tr><td>Outcome/ Subgroup</td><td>Veloderm</td><td>Vaseline gauze</td><td>Difference</td><td>P-value</td></tr>
<tr><td>Time to healing, mean days (SD)</td><td>8.4 (2.9)</td><td>8.9 (2.6)</td><td>0.5 day</td><td>0.045</td></tr>
<tr><td>Need for dressing change n/N (%)</td><td>6/48 (12.5)</td><td>15/48 (31.3)</td><td></td><td>0.0326</td></tr>
<tr><td>Exudate, number of patients with score 0 (%)</td><td colspan="4"></td></tr>
<tr><td>• Day 7</td><td>42 (87.5)</td><td>39 (81.2)</td><td></td><td>0.3858</td></tr>
<tr><td>• Day 10</td><td>48 (100)</td><td>45 (93.7)</td><td></td><td>0.0821</td></tr>
<tr><td>Peri-lesional erythema, number of patients with score 0 (%)</td><td colspan="4"></td></tr>
<tr><td>• Day 7</td><td>48 (100)</td><td>47 (97.9)</td><td></td><td>0.3275</td></tr>
<tr><td>• Day 10</td><td>48 (100)</td><td>48 (100)</td><td></td><td>1</td></tr>
<tr><td>Pain intensity , number of patients with score 0 (%)</td><td colspan="4"></td></tr>
<tr><td>• Day 7</td><td>37 (77.1)</td><td>30 (62.5)</td><td></td><td>0.1312</td></tr>
<tr><td>• Day 10</td><td>48 (100)</td><td>46 (95.8)</td><td></td><td>0.1595</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td colspan="6">Patton et al. 2013[10] – USA ; RCT 9/19</td></tr>
<tr><td colspan="5"></td><td rowspan="12">Mepitel One showed less pain, better ease of use, and a better overall experience for patients than treatment involving the use of staples.</td></tr>
<tr><td>Outcome/ Subgroup</td><td>Mepitel One

N = 21</td><td>Bridal Veil and staples
N = 21</td><td>Difference</td><td>P-value</td></tr>
<tr><td colspan="5">Pain at Day 7 (100 mm visual analogue scale), median</td></tr>
<tr><td>• At the beginning of dressing removal</td><td>4</td><td>11</td><td>7</td><td>0.1690</td></tr>
<tr><td>• At the midpoint of dressing removal</td><td>4</td><td>44</td><td>40</td><td>0.0118</td></tr>
<tr><td>• At the end of dressing removal</td><td>3</td><td>21</td><td>18</td><td>0.0791</td></tr>
<tr><td colspan="5">Dressing removal,</td></tr>
<tr><td>• % of adherence to the graft</td><td>11.8%</td><td>25.0%</td><td>13.2%</td><td>Not reported</td></tr>
<tr><td>• % of graft separation from</td><td>0</td><td>15%</td><td>15%</td><td>Not reported</td></tr>
<tr><td colspan="5">Graft take and healing at Day 7</td></tr>
<tr><td>• % (SD) of grafts with</td><td>98.7</td><td>94.1</td><td>4.6</td><td>0.1449</td></tr>
</table>

Main Study Findings					Conclusions
>95% take	(5.9)	(20.5)			
Peri-wound status (turgor, dryness, flakiness, maceration, blistering, erythema, and warmth)					
• Number of patients	0	1 graft site infection	1	Not reported	
Solanki et al. 2012[18] – Australia ; RCT 10/19					
Outcome/ Subgroup	AWBAT-D	Duoderm	**Difference**	***P*-value**	Authors concluded that AWBAT-D prolonged donor site healing and did not improve postoperative pain, nursing care, patient acceptability or discharge time compared to Duoderm.
Pain					
• *At rest*	Not reported			0.99	
• During dressing change	Not reported			0.90	
Wound size					
• Mean area in inches	42.4	38.8	3.6	0.83	
Time to re-epithelialization					
• Median days	17	11	6	0.007	
Time to discharge					
• Median days	8.5	6.5	2	0.38	
Incidence of infections					
No infection or scarring was observed					
Bailey et al. 2011[19] – USA ; RCT 11/19					
Outcome/ Subgroup	**Aquacel -Ag**	**Glucan II**	**Difference**	***P*-value**	Authors concluded that both dressing types, Aquacel-Ag and Glucan II, were beneficial for the use in donor site care.
Time to re-epithelialization					
• Average days	12.8	12.7	0.1	0.786	
Pain score					
• Day 1	2.40	2.45	-0.05	0.33	
• Day 3	2.35	2.85	-0.50	0.20	
• Day 5	1.75	2.50	-0.75	0.01	
• Day 9	1.41	1.47	-0.06	0.89	
Donor site infection					
Number of patients required dressing removal due to signs of infection	1	2	1	Not reported	
Dornseifer et al. 2011[16] – Germany ; RCT 12/19					
Outcome/ Subgroup	OpSite	Aquacel A	**Difference**	***P*-value**	The authors concluded that the polyurethane dressing was overall superior to Aquacel A.
Pain					
• *Incidence of higher rating*	Not reported		Odd ratio: 6.14 (favoring OpSite)	< 0.001	

<table>
<tr><th colspan="5">Main Study Findings</th><th>Conclusions</th></tr>
<tr><td colspan="5">Petkar et al. 2011[11] – India ; RCT 13/19</td><td rowspan="4">The authors concluded that negative pressure dressings improve graft take and speeds up the process of graft take in burn patients.</td></tr>
<tr><td>Outcome/ Subgroup</td><td>-ve pressure N = 21</td><td>Conventional N = 19</td><td>Difference</td><td>P-value</td></tr>
<tr><td>• Percentage graft take</td><td>96.67</td><td>87.53</td><td>9.1</td><td>< 0.001</td></tr>
<tr><td>• Duration of dressing (days)</td><td>8.1</td><td>11.2</td><td>3.1</td><td>< 0.001</td></tr>
<tr><td colspan="5">Blome-Eberwein et al. 2010[12] – USA and Canada ; RCT 14/19</td><td rowspan="12">Authors concluded that hydrofiber primary dressing with either a dry or wet protocol of care in the management of split-thickness donor sites.</td></tr>
<tr><td>Outcome/ Subgroup</td><td>Dry dressing N = 36</td><td>Wet dressing N = 34</td><td>Difference</td><td>P-value</td></tr>
<tr><td colspan="5">Donor site healing at day 14</td></tr>
<tr><td>• n (%)</td><td>24 (67%)</td><td>30 (88%)</td><td>6</td><td>0.046</td></tr>
<tr><td colspan="5">Pain score (visual analogue scale from 1 to 5)</td></tr>
<tr><td>• At rest (day 1-2)</td><td>3.0</td><td>1.8</td><td>1.2</td><td>0.097</td></tr>
<tr><td>• At rest (day 5)</td><td>2.3</td><td>1.8</td><td>0.5</td><td>0.477</td></tr>
<tr><td>• At rest (day 10)</td><td>1.6</td><td>1.6</td><td>0</td><td>0.894</td></tr>
<tr><td>• At rest (day 14)</td><td>1.6</td><td>1.5</td><td>0.1</td><td>0.968</td></tr>
<tr><td>• During mobility (day 1-2)</td><td>4.3</td><td>2.1</td><td>2.2</td><td>0.013</td></tr>
<tr><td>• During mobility (day 1-2)</td><td>3.6</td><td>2.6</td><td>1</td><td>0.189</td></tr>
<tr><td>• During mobility (day 1-2)</td><td>3.6</td><td>2.0</td><td>1.6</td><td>0.048</td></tr>
<tr><td>• During mobility (day 1-2)</td><td>2.1</td><td>1.8</td><td>0.3</td><td>0.758</td></tr>
<tr><td colspan="5">Markl et al. 2010[14] – Germany ; RCT 15/19</td><td rowspan="11">The authors concluded that Baitain-Ibu was the most appropriate dressing material for the treatment of split thickness skin grafts.</td></tr>
<tr><td>Outcome/ Subgroup</td><td>Suprathel N = 20</td><td>Biatain-Ibu N = 26</td><td>Mepitel N = 26</td><td>P-value</td></tr>
<tr><td colspan="5">Pain scores</td></tr>
<tr><td colspan="5">Results were provided graphically for each dressing a part; P-value was not reported for the difference between dressings</td></tr>
<tr><td colspan="5">Period to re-epithelialization</td></tr>
<tr><td>• Mean days (SD)</td><td>12.9 (3.08)</td><td>12.8 (2.37)</td><td>12.7 (2.17)</td><td>> 0.05</td></tr>
<tr><td colspan="5">Dressing changes</td></tr>
<tr><td>• Number of changes</td><td>0.3</td><td>1.5</td><td>4</td><td>< 0.001</td></tr>
<tr><td>• Duration of single change (minutes)</td><td>2.3</td><td>11.5</td><td>10.6</td><td>< 0.001
> 0.05[a]</td></tr>
<tr><td>• Total time consumption (minutes)</td><td>3.8</td><td>17.1</td><td>43.1</td><td>< 0.001</td></tr>
<tr><td colspan="5">[a] Biatain-Ibu versus Mepitel</td></tr>
</table>

<table>
<tr><th colspan="5">Main Study Findings</th><th>Conclusions</th></tr>
<tr><td colspan="5">Cigna et al. 2009[15] – Italy ; RCT 16/19</td><td></td></tr>
<tr><td colspan="5"></td><td rowspan="8">The authors concluded that Biatain-Ibu was a valuable alternative in the management of STSG donor site.</td></tr>
<tr><td>Outcome/ Subgroup</td><td>Biatain-Ibu N = 20</td><td>Jelonet gauze N = 20</td><td>Difference</td><td>P-value</td></tr>
<tr><td colspan="5">Pain (visual analogue scale 0 to 10)</td></tr>
<tr><td>• Descriptive readings</td><td>No pain</td><td>From 2 to 5</td><td colspan="2">Not applicable</td></tr>
<tr><td colspan="5">Itching</td></tr>
<tr><td>• Number of patients</td><td>2</td><td>18</td><td>16</td><td>Not reported</td></tr>
<tr><td colspan="5">Wound infection</td></tr>
<tr><td colspan="5">There was no incidence of wound infection</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td colspan="5">Ferreira et al. 2009[20] – Brazil ; RCT 17/19</td><td></td></tr>
<tr><td colspan="5"></td><td rowspan="11">The authors concluded that Veloderm (hemicellulose dressing) produced similar clinical results as those seen with the use of rayon dressing in the treatment of STSG</td></tr>
<tr><td>Outcome/ Subgroup</td><td>Veloderm N = 14</td><td>Rayon N = 14</td><td>Difference</td><td>P-value</td></tr>
<tr><td colspan="5">Dressing adherence (ordinal scale from 0, none, to 4, severe)</td></tr>
<tr><td>• Mean (SD)</td><td>6.2 (1.4)</td><td>3.6 (2.6)</td><td>2.6</td><td>0.003</td></tr>
<tr><td colspan="5">Hyperemia (ordinal scale from 0, none, to 4, severe)</td></tr>
<tr><td>• Mean (SD)</td><td>1.1 (1.7)</td><td>0.8 (1.5)</td><td>0.3</td><td>0.519</td></tr>
<tr><td colspan="5">Edema and Pruritus (ordinal scale from 0, none, to 4, severe)</td></tr>
<tr><td colspan="4">Results were not reported</td><td>> 0.43</td></tr>
<tr><td colspan="5">Pain (visual analogue scale from 0 to 10), mean (SD)</td></tr>
<tr><td>• Day 1</td><td>4.5 (3.0)</td><td>3.9 (2.4)</td><td>0.6</td><td rowspan="2">< 0.001</td></tr>
<tr><td>• Day 7</td><td>1.4 (2.3)</td><td>2.4 (2.7)</td><td>1</td></tr>
<tr><td>• Day 14</td><td>0.4 (1.3)</td><td>0.9 (1.7)</td><td>0.5</td><td rowspan="2">> 0.05</td></tr>
<tr><td>• Day 28</td><td>0</td><td>0.2 (0.8)</td><td>0.2</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td colspan="5">Lohsiriwat et al. 2009[21] – Thailand ; RCT 18/19</td><td></td></tr>
<tr><td colspan="5"></td><td rowspan="7">The authors concluded that the hydrofiber dressing (Aquacel) could reduce STSG donor site pain and promote re-epithelialization compared to paraffin gauze.</td></tr>
<tr><td>Outcome/ Subgroup</td><td>Aquacel</td><td>Paraffin gauze</td><td>Difference</td><td>P-value</td></tr>
<tr><td colspan="5">Rate of re-epithelialization</td></tr>
<tr><td>• Mean days (SD)</td><td>7.9 (2.8)</td><td>11.2 (3.5)</td><td>3.3</td><td>0.031</td></tr>
<tr><td colspan="5">Pain score (visual analogue scale from 0 to 10), mean</td></tr>
<tr><td>• At rest</td><td>0.74</td><td>0.80</td><td>0.06</td><td>0.894</td></tr>
<tr><td>• During dressing</td><td>3.1</td><td>4.7</td><td>1.6</td><td>0.027</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td colspan="5">Atherton et al. 2008[22] – UK ; RCT 19/19</td><td></td></tr>
<tr><td colspan="5"></td><td rowspan="7">The authors concluded that Allevyn did not enhance graft intake, but it improved patients' comfort. They concluded also that Allevyn is an effective dressing for small split and full thickness skin grafts.</td></tr>
<tr><td>Outcome/ Subgroup</td><td>Allevyn N = 29</td><td>Jellonet N = 29</td><td>Difference</td><td>P-value</td></tr>
<tr><td colspan="5">Rate of graft take at day five</td></tr>
<tr><td>• Percentage mean (SE)</td><td>90.3 (3.6)</td><td>92.3 (2.3)</td><td>2</td><td>0.963</td></tr>
<tr><td colspan="5">Comfort at dressing taking down (Visual analogue scale 0 to 10)</td></tr>
<tr><td>• Mean (SE)</td><td>1.6 (0.3)</td><td>2.1 (0.2)</td><td>0.5</td><td>0.0182</td></tr>
<tr><td colspan="5">Number of nursing interventions</td></tr>
</table>

Main Study Findings					Conclusions
• Mean (SE)	1.6 (0.2)	1.7 (0.3)	0.1	0.431	
Post-operative infection					
• Number of events	1	1	0		
Complications					
• Poor graft take, n	2	Not reported			